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| 10/693,762 | 10/22/2003 | Ga-Lane Chen | SEA/2666.1 | 2175 |

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| EXAMINER |
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BERNATZ, KEVIN M

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| ART UNIT | PAPER NUMBER |
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1773

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/693,762

Applicant(s)

CHEN, GA-LANE

Examiner

Kevin M Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 4-6, 10 and 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-9 and 12-16 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Examiner's Comments

1. Claim 1 recites the language "means for reading ... comprising a magneto-resistance sensor (MR)", which is an improper "means-plus-function" limitation since the means cannot be further modified by additional structure. As such, the Examiner has simply interpreted the above language as written without the additional scope afforded a proper "means-plus-function" limitation. Similarly, the language "means for storing said information ... on at least one surface thereof" is also an improper "means-plus-function" limitation since it further limits the means by requiring additional structural limitations.
2. Regarding the limitation(s) "magneto-optical (MO) type media" in claim 1, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicant's specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that while magneto-optical media have some generally accepted structures, the term is *not* defined by the prior art to explicitly mean a well-defined structure. Therefore, for the purpose of evaluating the prior art, the Examiner notes that any media capable of being used in an apparatus utilizing a magnetic head and some manner of optical/thermal affect would be sufficient to meet the claimed limitation (i.e. all known magnetic

recording media would meet the claimed limitation, since all *could* be used with the above structure, even if not explicitly designed for such use).

Election/Restrictions

3. Applicant's election of Group I, claims 1 – 3, 7 – 9 and 12 - 16 in the reply filed on November 15, 2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

4. Upon further review, the Examiner notes that the specie restriction required in the restriction requirement mailed October 21, 2004 is deemed no longer required and has been dropped since the disclosed species are deemed related variants to each other.

5. Finally, the Examiner notes that claims 1 – 3, 7 – 9 and 12 – 16 are *not* drawn to a magneto-optic type media, but are instead drawn to a storage system comprising nominal apparatus limitations in combination with a *non-nominal* magneto-optic type media. Since the apparatus limitations are deemed nominal, the restriction requirement is still deemed proper and is therefor FINAL.

Drawings

6. The Examiner notes that the present drawings are extremely difficult to read due to the compressed writing and large amount of information attempted to be presented on each individual Figure. Specifically, the Examiner notes that it is difficult to

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distinguish Figures "A" from "B" on each page and recommends printing Figures "A" and "B" on separate pages in order to improve the clarity of each Figure.

Claim Objections

7. Claims 3, 7 and 8 are objected to because of the following informalities: the use of "magnetic layer" and "hard magnetic layer" to distinguish separate layers is confusing and applicants should consider using "soft magnetic layer" and "hard magnetic layer" to better clarify which layer is being further limited in claims 7 and 8.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a soft magnetic layer between the substrate and the first layer of made of precious metal, does not reasonably provide enablement for the soft magnetic layer being anywhere between the "substrate" and the "series of superlattice multilayers". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. This rejection can be overcome by amending claim 15 to recite that the soft magnetic layer is formed in between the substrate and the first layer made of precious metal.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1, 2, 3, 9 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The language "consisting of a magnetic recording head comprising a magneto-resistive sensor (MR)" is indefinite since applicants are combining a transitional phrase closed to additional elements (i.e. "consisting of") with a transitional phrase open to additional elements (i.e. "comprising"). Specifically, it is unclear whether a "magnetic recording head" which includes a built in optical/thermal element would be excluded by the claimed limitation or not. I.e. the optical/thermal element could be considered as excluded by the "means for reading and writing information on a storage disk consisting of a magnetic recording head", but it could also be considered as covered/reading on the limitation "a magnetic head comprising a magneto-resistance sensor (MR)". For the purpose of evaluating the prior art, the Examiner has interpreted claim 1 as reciting "means for reading and writing information on a storage disk consisting of magnetic reading and writing, a magnetic head comprising a magneto-resistive sensor (MR), and ...".

Regarding claims 1 and 2, the phrase "magneto-optical (MO) type" renders the claim(s) indefinite because the claim(s) include(s) elements not actually disclosed (those encompassed by "magneto-optical (MO) type"), thereby rendering the scope of

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the claim(s) unascertainable. See MPEP § 2173.05(d). For purposes of evaluating the prior art, this limitation has been interpreted as described above in Paragraph 2.

The term "thin" in claim 3 is a relative term which renders the claim indefinite. The term "thin" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. This rejection can be overcome by removing the word "thin" from both occurrences in claim 3.

The use of the limitations "Z-DOL", "MMW" and "AM2001" in claim 9 is not permissible since these terms represent compounds whose structure and/or composition may change with time, and hence one of ordinary skill in the art would not be readily apprised of the scope of the invention since the scope of the material is not fixed. The Examiner further notes that "Z-DOL" appears twice in claim 9.

Claim 14 recites an overcoat layer and a lubricant layer, but depends from claims 12 and 1, which already recite an overcoat and lubricant layer. It is unclear if applicants are attempting to claim a *second* overcoat and lubricant layer or just repeating the already claimed overcoat and lubricant layer. For the purpose of evaluating the prior art, the Examiner has interpreted this claim as requiring only a single overcoat layer and lubricant layer above the superlattice multilayer, since applicants' as-filed disclosure only supports such an embodiment.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

13. Claims 1 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Lambeth et al. (U.S. Patent No. 6,248,416 B1).

Regarding claims 1 and 12, Lambeth et al. disclose a storage system comprising means for reading and writing information on a storage disk consisting of a magnetic recording head comprising a magneto-resistive sensor (MR) (*col. 1, line 18 bridging col. 2, line 18; col. 10, line 36 bridging col. 11, line 9; and Figure 1*); and means for storing said information in said storage disk, wherein said storage disk comprises a magneto-optical (MO) type media having a superlattice multilayer (*col. 25, lines 45 – 55 and col. 28, lines 8 – 18*), a diamond like carbon overcoat layer and a lubricant layer formed on at least one surface thereof (*col. 11, lines 56 – 67*).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambeth et al. as applied above, and further in view of Tang et al. (U.S. Patent No. 5,750,270).

Lambeth et al. is relied upon as described above.

Lambeth et al. fail to disclose the structure recited in claims 14 and 15.

However, Tang et al. teach that the recited structure is known in the art for magnetic superlattice structures possessing high coercivity, high anisotropy and high recording density (*col. 8, line 40 bridging col. 10, line 53*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Lambeth et al. to utilize the claimed recording medium structure as taught by Tang et al., since such a superlattice structure is known in the art as capable of possessing high coercivity, high anisotropy and high recording density.

16. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. (JP 09-198731 A) in view of Lambeth et al. ('416 B1) and Osato (U.S. Patent No. 5,591,515). See provided JPO Abstract Translation and Machine Translation of JP '731 A.

Regarding claim 1, Nakajima et al. disclose a storage system comprising means for reading and writing information on a storage disk using a magneto-optic method, and means for storing said information in said storage disk, wherein said storage disk comprises a MO type media.

Nakajima et al. fail to disclose the magneto-optic type media having a diamond like carbon overcoat and a lubrication layer formed on at least one surface.

However, Lambeth et al. teach forming overcoats and lubricant layers above recording layers for magnetic and magneto-optic media in order to provide improved protection and running properties (*col. 11, lines 56 – 67 and col. 27, lines 8 – 18*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Nakajima et al. to utilize an overcoat and a lubricant layer meeting applicants' claimed structural limitations as taught by Lambeth et al. since such a structure would provide the recording medium with improved protection and running properties.

While Lambeth et al. provides a clear teaching the recording media can be formed such that they are useful for both magnetic or magneto-optic media, neither Lambeth et al. nor Nakajima et al. explicitly teach exchanging the magneto-optic reading and writing means for a magnetic recording head comprising a MR sensor

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should the recording medium be utilized for magnetic recording as opposed to magneto-optic recording.

However, Osato explicitly teaches that one of ordinary skill in the art would readily appreciate that if a MO type disk was to be utilized for magnetic recording as opposed to MO recording, it would have been obvious to replace the MO reading and writing means with a magnetic head (*col. 10, lines 44 – 51*). The Examiner notes that Lambeth et al. provides explicit teaching that utilizing a MR sensor in a magnetic head is a well known method for reading data from magnetic recording layers.

It would therefore have been obvious to one of ordinary skill in the art at the time of applicant's invention to modify the device of Nakajima et al. in view of Lambeth et al. to utilize a magnetic recording head comprising a MR sensor as taught by Osato and Lambeth et al., since magnetic recording heads comprising MR sensors are known means for reading and writing information on a storage disk utilizing magnetic recording and not MO recording. Given that it has been shown in the art that "MO type" media are capable of use in both MO type recording/reproducing apparatus and magnetic recording/reproducing apparatus, it is deemed that one of ordinary skill in the art would have clearly possessed the knowledge to use the appropriate recording/reproducing apparatus depending on the means of recording/reproducing utilized on the medium.

Regarding claim 2, the Examiner notes that double sided optically assisted Winchester media are known in the art as being capable of achieving twice the recording capacity (i.e. capable of recording on both sides of the disk). E.g. see applicants' specification, page 2, lines 13 – 25.

17. Claims 1 – 3, 7 – 9, 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakajima et al. in view of Lambeth et al. and Osato as applied above, and further in view of Knight et al. (U.S. Patent No. 6,449,221 B1).

Nakajima et al., Lambeth et al. and Osato are relied upon as described above.

Regarding claim 3, Nakajima et al. disclose a MO media meeting applicant's claimed structural limitations, but in an inverted order (*Figure 1 and Paragraphs 0019 – 0034*).

However, Knight et al. teach that when using a first surface recording medium as opposed to a substrate-incident recording medium, the orders of the layers between the dielectric layers are inverted, thereby resulting in a structure reading on applicants' claimed limitations (*Figures 28A and 28B and col. 30, line 9 bridging col. 31, line 32*). The Examiner notes that first-surface recording is known to allow for smaller head-to-medium spacing, thereby allowing increased recording density.

It would, therefore, have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Nakajima et al. in view of Lambeth et al. and Osato to meet applicant's claimed structural and material limitations as taught by Nakajima et al. and Knight et al., since such a structure results in a first-surface recording medium having increased recording density.

Regarding claims 7, 8, 13 and 16, Nakajima et al. disclose materials meeting applicant's claimed limitations (*Paragraphs 0019 – 0034*).

Regarding claim 9, Lambeth et al. disclose lubricants meeting applicants' claimed limitations (*col. 11, lines 56 – 67*).

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hirata et al. (U.S. Patent No. 6,127,017) teach a magnetic recording disk suitable for first-surface recording (i.e. "near contact system") for magnetic or magneto-optic applications (*Abstract*). Fujita et al. (U.S. Patent No. 6,110,610) disclose a diamond-like carbon coating on a MO medium, but does not disclose also utilizing a lubricant layer (*entire disclosure*). Prabhakara et al. (U.S. Patent No. 5,855,746) teach a carbon protective layer under a lubricant for any storage media, though Prabhakara et al. do not explicitly disclose MO-type media, nor a diamond-like carbon coating (*entire disclosure*).

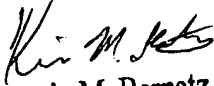
19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB
May 11, 2005


Kevin M. Bernatz, PhD
Primary Examiner